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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/931,689	08/16/2001	Wolfgang Werner	MUH-11086	3332

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EXAMINER	
FARAHANI, DANA	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 07/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/931,689	WERNER, WOLFGANG	
	Examiner	Art Unit	
	Dana Farahani	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5 and 6* is/are rejected.

7)☒ Claim(s) *3 and 4* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima (US Patent 6,066,863) in view of Burke (US Patent 5,793,070), both previously cited.

Fujishima discloses in figure 4 an IGBT with PN insulation (regions 403 and 406), a low-doped semiconductor substrate 401 of a first conductivity type; a low-doped drift zone 414 of the first conductivity type formed in the low-doped semiconductor substrate; and a first doped well zone 406 of the first conductivity type and a second doped well zone 408 of a second conductivity type, opposite to the first conductivity type, successively disposed between the drift zone and the semiconductor substrate providing an electrical PN insulation.

Fujishima does not explicitly disclose that the well regions are highly doped.

Burke discloses changing the doping of semiconductor layers changes their resistivity (see column 6, lines 36-39). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to change the doping of the layers in Fujishima in order to change the resistance of those layers in the IGBT, and therefore adjust the characteristics of the device.

3. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujishima in view of Burke, as applied to claim 1 above, and further in view of Shekar et al., hereinafter Shekar (U.S. Patent 5,317,171), previously cited.

Fujishima in view of Burke discloses the limitations in the claims, as discussed above, except for a cathode and an anode surrounding the IGBT cell at a distance at an edge of the drift zone.

Shekar discloses in figure 4 a thyristor device, which operate similar to an IGBT device (see column 4, lines 27-29), and has anode and cathode at a distance at an edge of drift zone 130. Shekar also discloses that by applying a voltage to the anode, a regenerative action takes place, and the cathode helps to stop this regenerative action (see column 4, lines 34-47; and column 5, lines 25-27). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an anode and a cathode in Fujishima's structure in order to further control the flow of current in the different layers of the IGBT device, particularly the drift zone.

Allowable Subject Matter

4. Claim 3 and 4 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter:

The primary reason for indications of allowability of claims 3 and 4 is inclusion therein of the limitation of the two well zones shorted together.

Product-by-Process Limitations

While not objectionable, the Office reminds Applicant that "product by process" limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao,* 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown,* 173 USPQ 685; *In re Luck,* 177 USPQ 523; *In re Fessmann,* 180 USPQ 324; *In re Avery,* 186 USPQ 161; *In re Wethheim,* 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.,* 218 USPQ 289; and particularly *In re Thorpe,* 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or otherwise. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.

Therefore, in claims 5 and 6, the method of making IGBT is given no patentable weight.

Response to Arguments

6. Applicant's arguments filed on 5/5/04 have been fully considered but they are not persuasive.

Applicant traverses the obviousness rejection of the rejected claims under 35 U.S.C. 103

(a) over the Fujishima and Burke references. Specifically, applicant disagrees that all the features of claim 1, except the relative resistivities of the well regions, are disclosed by the Fujishima reference, as the examiner states.

Applicant lists a comparative table between the elements of figure 4 of the reference, and some components of figure 1 of the instant application (not all the elements in the table are recited in claim 1). Applicant compares the n-conductive region 408 of the Fujishima reference with the region 2 of the instant application; and the p-conductive region 407 with region 4 of the instant application. Furthermore, applicant compares the p-conductive well 406 of the reference with the n-conductive well 8 of the instant application; and the n-conductive well 403 of the reference with the p-conductive well 9 of the instant application.

However, in the rejection by the examiner, the first doped well zone in the reference is defined as region 406 (of the first conductivity type) and the second doped well zone is defined as region 408 (of a second conductivity type). Therefore, applicant's analogy of the regions in the reference and the instant application is not what the examiner has based on the rejection.

After the applicant's analogy between the regions of the instant application and the primary reference, which are not consistence with the examiner's defined regions in the rejection, applicant argues that the drift zone 408 has a conductivity type opposite to the zone 406, while in the instant application well 8 and drift zone 2 have the same conductivity type. However, in claim 1, there is no relationship between any of the two well regions and the drift zone. As noted above, the drift zone defined in the above rejections, is region 414, which has the same doping as that of the substrate 401.

In response to the applicant's argument that it would not have been obvious to one of ordinary skill in the art at the time of the invention to make changes to the resistivity values of the well regions, the office maintains this obviousness rejection, since making changes to the resistivity of the components of a device is within the level of ordinary skill in the art. As the case law make it clear, discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch,* 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571)272-1705. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani
July 12, 2004